	Application No.	Applicant(s)
Notice of Allowability	10/650,362	GANESH ET AL.
	Examiner	Art Unit	
	Dieu-Minh Le	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the interview on 2/20&2/23/07 & TD filed on 03/01/07*.

2. ☒ The allowed claim(s) is/are *1,3-15, 31-44 [now as 1-28]*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None of the:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

       3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**
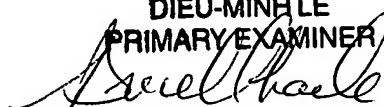
4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date *1/23/04 & 11/16/06*

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☐ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

DIEU-MINH LE
PRIMARY EXAMINER

1.   This office action is in response to the Interview on
02/20/2007, 02/23/2007 and the Terminal Disclaimer filed on
03/01/07.

2.   Claims 1, 3-15, 31-44 [now as 1-28] are allowable over
the prior art of record [claims 2, 16-30 have been
canceled; claims 31-44 have been added].

3.   An Examiner's Amendment to the record appears below.
Should the changes and/or additions be unacceptable to
applicant, an amendment may be filed as provided by 37
C.F.R. § 1.312. To ensure consideration of such an
amendment, it **MUST** be submitted no later than the payment
of the Issue Fee.

EXAMINER'S AMENDMENT:

IN THE CLAIMS:

    Please replace all prior versions of claims in the
application with the current listing claims in the
ATTACHMENT:

4.   Authorization for this Examiner's Amendment was given

in a telephone interview with Mr.Marcel K. Bingham,

Registration No. 42,327 on 02/20/2007 and 02/23/2007.

    Any comments considered necessary by applicant must be
submitted no later than the payment of the Issue Fee and,
to avoid processing delays, should preferably **accompany** the
Issue Fee. Such submissions should be clearly labeled
"Comments on Statement of Reasons for Allowance."

    Any inquiry concerning this communication or earlier
communications from the examiner should be directed to
Dieu-Minh Le whose telephone number is (571) 272-3660. The
examiner can normally be reached on Monday - Thursday from
8:30 AM to 6:00 PM.
    If attempts to reach the examiner by telephone are
unsuccessful, the examiner's supervisor, Scott Baderman can
be reached on (571)272-3644. The Tech Center 2100 phone
number is (571) 272-2100.
    Information regarding the status of an application may
be obtained from the Patent Application Information
Retrieval (PAIR) system. Status information for published
applications may be obtained from either Private PAIR or
Public PAIR. Status information for unpublished
applications is available through Private PAIR only. For
more information about the PAIR system, see http://pair-
direct.uspto.gov. Should you have questions on access to
the Private PAIR system, contact the Electronic Business
Center (EBC) at 866-217-9197 (toll-free).

DIEU-MINH THAI LE
PRIMARY EXAMINER
ART UNIT 2114

DML.
03/02/2007
ATTACHMENT:

LISTING OF CLAIMS:

1.   (Currently Amended) A method for applying
~~changes in~~ redo records ~~to make a particular~~
~~resource reflect changes made to the~~
~~particular resource in volatile memory before~~
~~a failure~~from a log that reflect changes to a
plurality resources, the method comprising the
steps of:

for each resource of said plurality of resources,

establishing links that link together a set of

redo records that contain changes made to the

~~particular~~ resource; ~~and~~

for a particular resource of said plurality of

resources, applying changes in the respective set

of redo records to cause a particular resource to

reflect changes made to the particular resource

in volatile memory before a failure;

wherein the step of applying changes includes

following the respective links established for

the particular resource to apply the changes

contained in the respective set of redo records

~~to cause the particular resource~~; and

wherein establishing links that link together the set

of redo records for each resource of said

plurality of resources is performed prior to

~~reflect the changes made to the particular~~

~~resource in volatile memory before~~ the failure.

2.   (Cancelled)

3.   (Currently Amended) The method of Claim 1, wherein the
step of following the links to apply the changes contained
in the set of redo records is performed in response to a
transaction requesting, subsequent to the failure, access
to the particular resource ~~subsequent to the failure~~.

4.   (Currently Amended) A method for applying

changes in redo records to make a resource

available, wherein the resource is locked by a

dead transaction, the method comprising the

steps of:

(A) identifying a redo record in a block-~~base~~based

redo chain, wherein the redo record contains

least recent changes made as of a particular

checkpoint time that need to be applied to the

resource;

(B) applying the least recent changes contained in the

redo record to the resource; and

(C) repeating steps (A) and (B) until all changes that

are contained in redo records in the block-

~~base~~based redo chain have been applied to the

resource.

5.   (Original) A method for applying changes in

two or more undo records in parallel, wherein

a plurality of resources are locked by a dead

transaction, the method comprising the steps

of:

identifying, within a single undo log file, a

plurality of sets of undo records, wherein each

set of undo records of said plurality of sets of

undo records does not contain any undo record

that depends on any undo record in any other set

of undo records of said plurality of sets of undo

records; and

applying the plurality of sets of undo records in

parallel relative to one another.

6.   (Original) The method of Claim 5, further

comprising establishing the plurality of sets of

undo records by performing steps that comprise:

among the plurality of sets of undo records:

assigning all undo records that are associated with a

first resource to a first set of undo records;

and

assigning all undo records that are associated with a

second resource to a second set of undo records.

7.   (Original) The method of Claim 6, wherein:

the step of assigning all undo records that are

associated with the first resource includes the

step of linking in a first chain undo records

that contain changes that are associated with the

first resource; and

the step of assigning all undo records that are

associated with the second resource includes the

step of linking in a second chain undo records

that contain changes that are associated with the

second resource.

8.   (Original) The method of Claim 7, wherein:

the step of linking in the first chain undo records

that contain changes that are associated with the

first resource includes the step of generating a

first block-based undo chain, wherein the first

block-based undo chain contains. undo records

that contain changes that need to be applied to

the first resource; and

the step of linking in the second chain undo records

that contain changes that are associated with the

second resource includes the step of generating a

second block-based undo chain, wherein the second

block-based undo chain contains undo records

that contain changes that need to be applied to

the second resource.

9.   (Original) A method for linking undo records,

the method comprising the steps of:

identifying an undo record, wherein the undo record

contains change information that is associated

with a particular resource;

linking the undo record into an undo record chain,

wherein the undo record chain contains only undo

records that contain change information that is

associated with the particular resource; and

wherein the step of linking the undo record includes

generating identifying data in at least one of

the records in the undo record chain or in the

undo record, wherein said identifying data once

generated identifies a particular record in the

undo record chain.

10.   (Original) The method of claim 9, wherein:

the step of identifying the undo record includes the

step of identifying an undo record that contains

change information that is associated with a

particular data block; and

the step of linking the undo record into the undo

record chain, includes the step of linking the

undo record into the undo record chain, wherein

the undo record chain contains only undo records

that contain change information that is

associated with the particular data block.

11.   (Original) The method of claim 9, further

comprising the steps of:

identifying a first undo record, wherein relative to

the undo record chain the first undo record

contains the least recent change information that

needs to be applied to the particular resource;

and

linking a pointer in the first undo record to the undo

record chain.

12.   (Original) The method of claim 9, further

comprising the steps of:

identifying a last undo record, wherein relative to

the undo record chain the last undo record

contains the most recent change information that

needs to be applied to the particular resource;

and

linking a pointer in the last undo record to the undo

record chain.

13.   (Original) The method of claim 9, wherein the

undo record chain contains only undo records that

contain change information that needs to be applied to

the particular resource.

14.   (Original) A method for recovering after failure

of a transaction, the method comprising the step of:

prior to said failure, storing in a first recovery

record data that reflects a first change made by

the transaction to a first resource;

after making said first change and prior to said

failure, storing in a second recovery record data

that reflects a second change by the transaction

to a second resource;

after making said second change and prior to said

failure, storing in a third recovery record data

that reflects a third change to said first

resource;

after said failure, recovering said transaction; and

wherein the step of recovering said transaction

includes applying said data in said first

recovery record and said data in said third

recovery record prior to applying said data in

said second recovery record.

15.   (Original) The method of claim 14, wherein:

the step of storing in a first recovery record

comprises the step of storing in a first undo

record;

the step of storing in a second recovery record

comprises the step of storing in a second undo

record;

the step of storing in a third recovery record

comprises the step of storing in a third undo

record; and

the step of applying said data comprises the step

of applying said data in said first undo

record and said data in said third undo record

prior to applying said data in said second

undo record.

16. - 30. (Cancelled)

31. (New) A computer-readable storage medium

    storing one or more sequences of instructions

    for applying redo records from a log that

    reflect changes to a plurality resources,

    wherein execution of the one or more sequences

    of instructions by one or more processors

    causes the one or more processors to perform

    the steps of:

    for each resource of said plurality of resources,

        establishing links that link together a set of

        redo records that contain changes made to the

        resource;

    for a particular resource of said plurality of

        resources, applying changes in the respective set

        of redo records to cause a particular resource to

        reflect changes made to the particular resource

        in volatile memory before a failure;

    wherein the step of applying changes includes

        following the respective links established for

        the particular resource to apply the changes

contained in the respective set of redo records;

and

wherein establishing links that link together the set

of redo records for each resource of said

plurality of resources is performed prior to the

failure.

32. (New) The computer-readable storage medium of Claim

31, wherein the step of following the links to apply the

changes contained in the set of redo records is performed

in response to a transaction requesting, subsequent to the

failure, access to the particular resource.

33. (New) A computer-readable storage medium

storing one or more sequences of instructions

for applying changes in redo records to make a

resource available, wherein execution of the

one or more sequences of instructions by one

or more processors causes the one or more

processors to perform the steps of:

(A) identifying a redo record in a block-based redo

   chain, wherein the redo record contains least

   recent changes made as of a particular checkpoint

   time that need to be applied to the resource;

(B) applying the least recent changes contained in the

   redo record to the resource; and

(C) repeating steps (A) and (B) until all changes that

   are contained in redo records in the block-based

   redo chain have been applied to the resource.

34.   (New) A computer-readable storage medium storing one

or more sequences of instructions for applying changes in

two or more undo records in parallel, wherein execution of

the one or more sequences of instructions by one or more

processors causes the one or more processors to perform the

steps of:

identifying, within a single undo log file, a

   plurality of sets of undo records, wherein each

   set of undo records of said plurality of sets of

   undo records does not contain any undo record

   that depends on any undo record in any other set

of undo records of said plurality of sets of undo

records; and

applying the plurality of sets of undo records in

parallel relative to one another.

35. (New) The computer-readable storage medium of

Claim 34, the steps further comprising

establishing the plurality of sets of undo

records by performing steps that comprise:

among the plurality of sets of undo records:

assigning all undo records that are associated with a

first resource to a first set of undo records;

and

assigning all undo records that are associated with a

second resource to a second set of undo records.

36. (New) The computer-readable storage medium of

Claim 35, wherein:

the step of assigning all undo records that are

associated with the first resource includes the

step of linking in a first chain undo records

that contain changes that are associated with the

first resource; and

the step of assigning all undo records that are

associated with the second resource includes the

step of linking in a second chain undo records

that contain changes that are associated with the

second resource.

37.   (New) The computer-readable storage medium of

Claim 36, wherein:

the step of linking in the first chain undo records

that contain changes that are associated with the

first resource includes the step of generating a

first block-based undo chain, wherein the first

block-based undo chain contains undo records

that contain changes that need to be applied to

the first resource; and

the step of linking in the second chain undo records

that contain changes that are associated with the

second resource includes the step of generating a

second block-based undo chain, wherein the second

block-based undo chain contains undo records
that contain changes that need to be applied to
the second resource.

38.   (New) A computer-readable storage medium storing one
or more sequences of instructions for linking undo records,
wherein execution of the one or more sequences of
instructions by one or more processors causes the one or
more processors to perform the steps of:

identifying an undo record, wherein the undo record

contains change information that is associated

with a particular resource;

linking the undo record into an undo record chain,

wherein the undo record chain contains only undo

records that contain change information that is

associated with the particular resource; and

wherein the step of linking the undo record includes

generating identifying data in at least one of

the records in the undo record chain or in the

undo record, wherein said identifying data once

generated identifies a particular record in the

undo record chain.

39. (New) The computer-readable storage medium of

claim 38, wherein:

the step of identifying the undo record includes the

step of identifying an undo record that contains

change information that is associated with a

particular data block; and

the step of linking the undo record into the undo

record chain, includes the step of linking the

undo record into the undo record chain, wherein

the undo record chain contains only undo records

that contain change information that is

associated with the particular data block.

40. (New) The computer-readable storage medium of

claim 38, the steps further comprising:

identifying a first undo record, wherein relative to

the undo record chain the first undo record

contains the least recent change information that

needs to be applied to the particular resource;

and

linking a pointer in the first undo record to the undo

record chain.

41. (New) The computer-readable storage medium of

claim 38, the steps further comprising:

identifying a last undo record, wherein relative to

the undo record chain the last undo record

contains the most recent change information that

needs to be applied to the particular resource;

and

linking a pointer in the last undo record to the undo

record chain.

42. (New) The computer-readable storage medium of

claim 38, wherein the undo record chain contains

only undo records that contain change information

that needs to be applied to the particular

resource.

43.   (New) A computer-readable storage medium storing

one or more sequences of instructions for

recovering after failure of a transaction,

wherein execution of the one or more sequences of

instructions by one or more processors causes the

one or more processors to perform the steps of:

prior to said failure, storing in a first recovery

record data that reflects a first change made by

the transaction to a first resource;

after making said first change and prior to said

failure, storing in a second recovery record data

that reflects a second change by the transaction

to a second resource;

after making said second change and prior to said

failure, storing in a third recovery record data

that reflects a third change to said first

resource;

after said failure, recovering said transaction; and

wherein the step of recovering said transaction

includes applying said data in said first

recovery record and said data in said third

recovery record prior to applying said data in

said second recovery record.

44.   (New) The computer-readable storage medium of

     claim 43, wherein:

     the step of storing in a first recovery record

          comprises the step of storing in a first undo

          record;

     the step of storing in a second recovery record

          comprises the step of storing in a second undo

          record;

     the step of storing in a third recovery record

          comprises the step of storing in a third undo

          record; and

     the step of applying said data comprises the step of

          applying said data in said first undo record and

          said data in said third undo record prior to

          applying said data in said second undo record.